librium with its storage atmosphere or formed during incorporation into the element. This is clearly practicable for states a) and c), but possibly leads to a less physically stable element in stage b);

ii) lightly coated, that is, carrying a thin coating of a passivating or water-displacing material or the residue of such coating formed during incorporation into the element. This is similar to i) but may afford better controllability in manufacture;

iii) polymer-coated but conductive when undeformed.

This is exemplified by granular nickel/polymer compositions of so high nickel content that the physical properties of the polymer are weakly if at all discernible. As an example, for nickel starting particles of bulk density 0.85 to 0.95 this corresponds to a nickel/silicone volume ratio (tapped bulk: voidless solid) typically over about 100. Material of form iii) can be applied in aqueous suspension. The polymer may or may not be an elastomer. Form iii) also affords better controllability in manufacture than i).

iv) Polymer-coated but conductive only when deformed. This is exemplified by nickel/polymer compositions of nickel content lower than for iii), low enough for physical properties of the polymer to be discernible, and high enough that during mixing the nickel particles and liquid form polymer become resolved into granules rather than forming a bulk phase. This is preferred for b) and may be unnecessary for a) and c). It is preferred for the present invention: more details are given in co-pending application PCT/GB99/00205. An alternative would be to use particles made by comminuting materials as in v) below. Unlike i) to iii), material iv) can afford a response to deformation within each individual granule as well as between granules, but ground material v) is less sensitive. In making the element, material iv) can be applied in aqueous suspension;

v) Embedded in bulk phase polymer. This relates to a) and c) only. There is response to deformation within the bulk phase as well as between textile fibres.

The general definition of the preferred variably resistive material exemplified by iv) and v) above is that it exhibits quantum tunnelling conductance ('QTC') when deformed. This is a property of polymer compositions in which a filler selected from powder-form metals or alloys, electrically conductive oxides of said elements and alloys, and mixtures thereof is in admixture with a non-conductive elastomer, having been mixed in a controlled manner whereby the filler is dispersed within the elastomer and remains structurally intact and the voids present in the starting filler powder become infilled with elastomer and particles of filler become set in close proximity during curing of the elastomer.

The connective textile member providing a highly flexible and durable electrically conductive pathway to and from each electrode may for example comprise conductive tracks in the non-conducting textile support fabric, ribbon or tape. The conductive tracks may be formed using electrically conductive yarns which may be woven, knitted, sewn or embroidered onto or into the non-conducting textile support. As in the construction of the electrodes, stainless steel fibres, monofil and multifilament are convenient as conductive yarns. The conductive tracks may also be printed onto the non-conducting textile support. In certain cases the conductive tracks may need to be insulated to avoid short circuits and this can be achieved by for example coating with a flexible polymer, encapsulating in a non-conducting textile cover or isolating during the weaving process. Alternatively the yarns may be spun with a conductive core and non-conducting outer sheath. In another alternative at least one connective member comprises variably resistive material pre-stressed to conductance, as described in PCT/GB99/02402.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** shows a basic switch;

FIG. **2** shows a switch adaptable to multiple external circuits;

FIG. **3** shows a multiple key device; and

FIG. **4** shows a position-sensitive switch.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In conjunction with appropriate electronics the devices may be used for digital type switching, analogue switching, proportional control, pressure sensing, flex sensing in the following applications, for example:

- interfaces to electronic apparatus such as:
- computers, PDA, personal audio, GPS;
- domestic appliances, TV/video, computer games, electronic musical instruments, toys lighting and heating, clocks and watches;
- personal healthcare such as heart rate monitors, disability and mobility aids;
- automotive user controls;
- controls for wearable electronics;
- educational aids;
- medical applications such as pressure sensitive bandages, dressings, garments, bed pads, sports braces;
- sport applications such as show sensors, sensors in contact sport (martial arts, boxing, fencing), body armour that can detect and measure hits, blows or strikes, movement detection and measurement in sports garments;
- seat sensors in any seating application for example auditoria and waiting rooms;
- garment and shoe fitting;
- presence sensors, for example under-carpet, in-flooring and in wall coverings.

Referring to FIG. **1**, the basic textile switch/sensor device comprises two self-supporting textile electrodes **10**,**12** sandwiching variably resistive element **14** made by applying to nylon cloth an aqueous suspension of highly void-bearing granular nickel-in-silicone at volume ratio within the composition of 70:1 capable of quantum tunnelling conduction, as described in PCT/GB99/00205. Electrodes **10**,**12** and element **14** are fixed in intimate contact so as to appear and function as one textile layer. Each electrode **10**,**12** is conductively linked to a connective textile element **16** consisting of stainless steel thread in nylon tape **18** extending from electrodes **10**,**12**. When pressure is applied to any area of electrode **10**,**12** the resistance between them decreases. The resistance between electrodes **10**,**12** will also decrease by bending.

Referring to FIG. **2**, in a variant of the basic textile switch/sensor, upper layer **20** is a non-conducting textile support under which adheres the upper electrode constituted by discrete electrically conductive sub-area **22** conductively linked to connective member **24**, which is a conductive track in extension **26** of support **20**. Variably resistive element **28**, similar to that of element **14** above but containing polyurethane binder, is provided as a coating on lower electrode **29**, the area of which is greater than that of upper electrode **22**. Lower electrode **29** is formed with lower connective mem-